We have, fortunately, no representative of the termites, or white ants, in Britain, though one species is found as far north as Bordeaux; but the author figures the huge nests of several Australian species, one of which, *Termes meridionalis,* Froggatt, builds what is called a "magnetic nest," like a brick wall, about 10 feet high and long (judging from the figure of the man standing in front), always pointing north and south, with the wall facing east and west. Another species, *Eutermes pyriformis,* builds a towering pillar-shaped nest, often 18 feet high.

Among the more remarkable specially Australian insects of various orders figured in this book, we may mention the curious apterous desert cockroaches (genus Polyzosteria, p. 19); the great Phasmidæ (of which *Podacanthus wilkinsoni,* Macleay, is figured as an example on plate v.); various strange grasshoppers, &c. (on plates vi. and vii.), and neuropterous insects (pp. 60, 61, plate ix.); the curious sawflies belonging to the genus Perga, &c. (pp. 71-73, plates x. and xi.); various handsome Buprestidæ (plate xviii.); the gaudy day-flying moths of the family Agaristidæ (p. 233) and the "whistling (stridulating) moths" of the genus Hecatesia, which emit sounds like the call of a Cicada (pp. 234, 235), of which latter group there are also many large and remarkable Australian species. We may also note that while the butterflies of Australia are not specially numerous or remarkable, the moths are extremely numerous and interesting, many being very remarkable either for their size, their structure, or their beauty. Of course, we do not meet with many British species, but among them we may mention forms of the painted lady butterfly and the convolvulus hawkmoth, hardly distinct from the ordinary European insects, and the well-known meal moth or flour moth (*Asopia farinalis,* L.) figured on p. 269.

Occasionally we note a trifling error; thus, on p. 41, the names *Locusta danica* and *Œdaleus senegalensis* appear to have been transposed by some accident.

We congratulate Mr. Froggatt on the publication of this useful and interesting book. W. F. K.

OUR BOOK SHELF.

Nature's Craftsmen: Popular Studies of Ants and other Insects. By Henry Christopher McCook. Illustrated from Nature. Pp. xi+317. (London and New York: Harper and Brothers, 1907.) Price 7*s.* 6*d.* net.

W F Kirby

DR. McCook has long been known as one of the most painstaking and successful of the investigators of insect life in America, and the publication of a selection of his researches in a more popular form will, we hope, bring them under the notice of a far wider public than his former works have appealed to. There is no want of variety in the volume before us, and, in addition to ants and spiders, which are perhaps the author's favourites, he discusses bees, wasps, ant-lions, cicadas, caddises, &c. Still, nearly one-third of the book is taken up with the most interesting subject of the whole insect world, ants; probably the most highly organised of all known animals, born, not only in complete armour, like some of the ancient gods and heroes, but provided with all the tools and requisites necessary for their busy and industrious lives, even to brushes and combs, &c. Their wonderfully organised communities, where each works for all, and all for each, make our most advanced civilisations appear almost as barbarism in comparison, and our grandest architectural and engineering triumphs little better than mud-pies.

Among the most curious developments of ant-life are the so-called "honey-ants," where the nests contain a certain class of ants in which the abdomen becomes enormously distended with a sweet substance derived from a kind of oak-gall. When they have attained this condition, they pass their lives in the nests, hanging to the uneven roofs of the vaulted chambers, and they dispense food to the workers, by whom they are tended like the other dependent classes of the community, such as the queens and larvæ. An excellent illustration of one of these internal chambers is given on p. 99. This was taken from a nest eight feet long, three feet high, and a foot and a half wide, formed of galleries and chambers honeycombed in the solid rock.

The book is written in a very pleasing style throughout, with the exception of the last few pages, which bear signs of haste. The illustrations are also numerous and spirited and many readers will be pleased to see the frontispiece, which gives us a portrait of the amiable author sitting on a lawn in a garden chair.

In conclusion, we may perhaps venture to express a regret that the word "instinct" is still used, as it appears to us to be an obsolete expression which is philosophically untenable at the present day, and which it would be just as well to avoid.

Concrete Steel Buildings. By W. Noble Twelvetrees. Pp. xii+408. (London: Whittaker and Co., 1907.) Price 10*s.* net.

Prof [illegible]

THIS is a companion volume to the author's work on concrete steel, in which the distinctive characteristics of reinforced concrete were dealt with, and the theory underlying the design of structures in this material was discussed fully and in detail. In the present volume the author gives particulars of a number of typical pieces of constructional work in ferro-concrete which have been carried out in this country and abroad during the past few years. Mr. Twelvetrees has selected with great care the various examples of this method of building construction which he describes, and architects and engineers who consult this book will have little trouble in finding full descriptions of buildings similar to any they may be called upon to design. Examples of transit sheds for docks, railway goods stations, warehouses, factory buildings, business premises, villas, flour mills, hotels, theatres, &c., are all in turn fully described, and excellent illustrations are given of all important details, with copious notes as to the methods of making the concrete, the nature and disposition of the reinforcing steel, and of the results of proof tests of the structures. In the illustrations, which form a very important feature of a book of this nature, the author has wisely contented himself with giving the chief overall dimensions. When a radical departure from ordinary practice, such as the use of ferro-concrete, is made in constructional works, much can be learnt from the inevitable failures, and the last chapter of the book is devoted to a brief account of a few noteworthy collapses and of the probable causes of these failures, whether due to faulty design, or to bad workmanship, or to both causes. In the appendix a list is given of concrete-steel buildings and other structures in the United Kingdom, which will be found useful by those who are anxious to have the chance of inspecting such works before

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deciding to adopt this type of construction in any given case. An excellent index adds much to the value of this book for reference purposes, which will prove a welcome addition to the library of every architect and civil engineer. T. H. B.

Waterworks Management and Maintenance. By W. D. Hubbard and Wynkoop Kiersted. Pp. vi+429. (New York: J. Wiley and Sons; London: Chapman and Hall, Ltd., 1907.) Price 17*s.* net.

THIS book is divided into three parts, the first dealing with the methods and principles of developing, improving, and storing water supplies; the second with the maintenance and operation of waterworks; and the third with water rates, and depreciation and valuation of waterworks property.

W. H. Wheeler

Although this book treats of American practice, and cannot be regarded as a text-book for experts, yet it contains a great deal of information useful to those having the designing and management of waterworks for urban districts.

The authors point out that in selecting a source from which a supply can be obtained a knowledge of the physical characteristics of the territory from which the water is to be obtained is the first consideration; a chemical analysis is necessary to detect impurities; and as drinking water is a medium through which the bacilli of certain diseases may be imbibed, and infection thus widely disseminated, a rigid bacterial examination has now become a recognised necessity.

Chapter i. treats of ground water supply and wells, the percolating capacity of soils, rate of filtration through sand, and purification works. The second chapter deals with water supply from rivers, and the means of fitting it for domestic use. The third chapter describes the class of engines in use for pumping, the other chapters treating of plans and records, service connections, meters and fittings, fire protection, financial management and accounts, water rates, and depreciation.

Attention is directed to the subject of electrolysis, or the effect that the introduction of street railways worked by electricity has had on the water mains; and illustrations are given showing the effect of electrolysis on the cast-iron mains. As a result of electrolytic action the metal of the pipes becomes in some cases so softened that it can be cut with a knife. Cast-iron is affected the least, wrought-iron next, mild steel the next, then high carbon steel, and lead the most. The salts in the ground also have a varying effect, the order of activity being chlorides, nitrates, and sulphates. The drier the soil the more resistance it offers to the passage of the current. Wasting of the lead in the joints also leads to leakage and eventual failure of the pipe by the blowing out of the lead.

Pictures from Nature's Garden; Stories from Life in Wood and Field. By H. W. Shepheard Walwyn. Pp. 311; illustrated. (London: John Long.) Price 6*s.*

To the naturalist the chief point of interest in this little volume is undoubtedly centred on the illustrations, which are reproductions from photographs by the author. Among these we may specially refer to one of a dormouse asleep (p. 34), which, so far as we know, is unique, and certainly of great interest. The photograph of a sleeping bat, apparently a pipistrelle (p. 27), is likewise excellent, as is also one of a Japanese or Manchurian sika-deer, with the white "chrysanthemums" on the buttocks fully expanded (p. 306). In both these instances it is a pity that the names of the species depicted are not given. As to the text, we venture to think even the author himself would admit that it is scarcely of a nature demanding detailed notice in the columns of this journal.

Lydekker

R. L.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

On Correlation and the Methods of Modern Statistics.

IN NATURE of August 29 (p. 461) appeared some account of a discussion at the British Association on modern methods of treating statistics. The following paragraph occurs:—

"Mr. A. R. Hinks, who was somewhat sceptical as to the general applicability of the new methods, inquired what meaning could be attached to the value 0·3 of the correlation coefficient in such cases as $y=\log x$. He also gave an example in which questionable conclusions had been arrived at by the method, the reason being that certain groups of stars had been studied for special purposes, while others had been neglected."

The obvious answer to the first part of Mr. Hinks's inquiry is that no meaning could be attached to the particular value 0·3 unless we were told what part of the relation $y=\log x$ it referred to, and then it would have a quite definite but limited meaning. Every statistician trained in modern methods in the case of statistics belonging to new material plots his regression lines and tests the approach to linearity in his material. When he finds any orderly system, but no approach to linearity, he naturally tests the dependence of his characters by the correlation ratio. That test applied to Mr. Hinks's case of two absolutely correlated variables $y=\log x$ gives unity or perfect correlation, as we might anticipate.

Writing to Mr. Hinks for further information as to the bearing of the second part of his criticism, he tells me that the report is too brief to be intelligible, and owing to his courtesy I have been provided with a fuller report of his speech, in proof, for the Journal of the Royal Statistical Society. The "questionable conclusions" reached by the method of correlation to which he refers occur in "a recent paper published under the auspices of Prof. Karl Pearson" (Winifred Gibson, Monthly Notices R.A.S., vol. lxvi., p. 445), and the special point to which Mr. Hinks refers is the result reached by Miss Gibson for the relationship between parallax and photometric magnitude. The point is an extremely interesting one, and that must be my excuse for ventilating the matter in the pages of NATURE. Mr. Hinks makes two criticisms, the first as to method and the second as to matter.

First, as to Method.—Mr. Hinks says that if the stars were uniform in size and brilliancy, the parallax and magnitude relation would be logarithmic, and consequently the coefficient of correlation would not be unity. "He understood that in such a case it was proper to use correlation ratios, but not correlation coefficients. If this was so, he would ask the exponents of modern methods to erect a very large and conspicuous danger signal to keep astronomical statisticians from falling into such a trap."

Now Miss Gibson's paper was, I believe, the first to place modern statistical methods before astronomers, and the statistician may well make slips in a new field. But as to *method*; what does she actually do? She calculates (1) the correlation coefficient between magnitude and parallax, (2) the correlation coefficient between parallax and amount of light, and finding both small, she plots (3) the regression line, and calculates the correlation ratio, and as this takes a value of 0·4, she points out that the correlation coefficient is not the suitable measure in this case. In other words, she puts up the very danger signal which Mr. Hinks requires! I fail entirely to see how Mr. Hinks's remarks as to the logarithmic relation apply to Miss Gibson's work. She has treated the matter correctly from the statistical standpoint, and her paper shows that she was fully aware of the possibilities attached to a logarithmic relationship, which she more than once cites.

Secondly, as to Matter.—Here Mr. Hinks is on safer ground, but one in which I fancy astronomers have been guilty of a considerable amount of circular reasoning.

They start from the hypothesis that magnitude is very closely related to parallax, and when the statistician shows that the best determined parallaxes show no continuous relationship between parallax and magnitude, they turn

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